

Industrial Benchmarking for Competitive Advantage

by

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ABSTRACT This paper deals with several different aspects of the concept of benchmarking in order to give the audience a basic understanding of what benchmarking is, how it is done, and what it can give in terms of improvement results. The main issues covered are definitions of benchmarking and the core concept of comparison for the sake of improvement, explanations of the different types of benchmarking that exist and what implications these have, both in terms of improvement potential, difficulties, and suitability. Furthermore, ethical and legal aspects linked to benchmarking and the benchmarking wheel, a benchmarking process model explaining the phases and steps of the benchmarking study. A relatively large portion of the paper will be devoted to explaining how to carry out a benchmarking study and various pitfalls that might be encountered. The remainder of the paper will discuss the improvement results that companies that have used benchmarking actually have achieved. These range from phenomenal successes to downright failures, and the paper will explore conclusions derived from research on the topic.

Keywords: Benchmarking, industrial competitiveness, TQM.



Biography: Bjørn Andersen, Ph.D., is an associate professor at the Norwegian University of Science and Technology in Trondheim, Norway as well as scientific advisor to the research foundation SINTEF. During his doctorate studies, he spent eight months at Rochester Institute of Technology working on the subject of benchmarking and the results achievable through use of the tool. He has co-authored and authored several books and papers and has been involved in or managed several research and implementation projects on benchmarking, quality improvement, productivity, and material and production management during the last years.

1 Definitions of benchmarking

Looking exclusively at the noun benchmarking, its original meaning is:

A predefined position, used a reference point for taking measures against.

This word has migrated into the business world, where it has come to mean:

A benchmark is a measured “best-in-class” achievement recognized as the standard of excellence for that business process.

Turning to the verb, or the activity, benchmarking, it can somewhat philosophically be defined as follows:

Benchmarking is the practice of being humble enough to admit that someone else is better at something, and being wise enough to learn how to match them and even surpass them at it (APQC, 1993).

This definition captures the essence of benchmarking, namely learning from others. The term *benchmark* probably originally comes from geographic surveying, where points in the terrain were given with reference to a fixed point, often a tall peak or some other easily recognizable and definable point. At this point, two stone slates were raised on end and spaced somewhat apart and a third slate laid on top of these, thus forming some kind of a stone bench, from which came the word benchmark. Based on its meaning of comparison against a reference point or the optimal, it was put to use in the business world, extended, and is currently defined as shown in Figure 1 (Andersen and Pettersen, 1996).

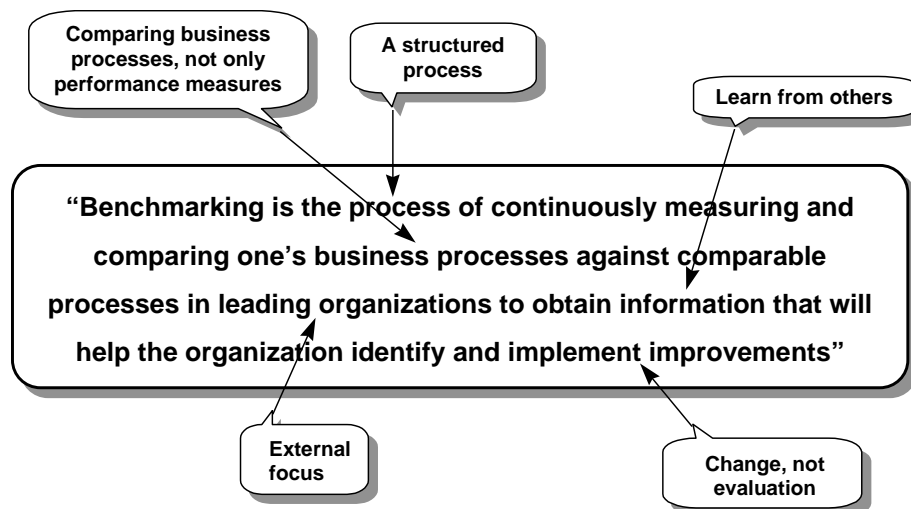


Figure 1 Operational definition of benchmarking

Many view benchmarking as a method for comparing key figures, often financial key figures, for the purpose of ranking the organization in relation to competitors or the industry average. This might have been the main application of benchmarking earlier, but today it is a far more powerful tool much more widely applicable. The core of the current interpretation of benchmarking is:

- *Measurement*, of own and the benchmarking partners' performance level, both for comparison and for registering improvements.
- *Comparison*, of performance levels, processes, practices, etc.
- *Learning*, from the benchmarking partners to introduce improvements in your own organization.
- *Improvement*, which is the ultimate objective of any benchmarking study.

Four main issues that support and advocate the use of benchmarking in an organization striving to improve are:

1. Benchmarking helps the organization understand and develop a critical attitude toward its business processes.
2. Benchmarking encourages an active learning process in the organization and motivates change and improvement.

3. Through benchmarking, the organization can find new sources for improvement and new ways of doing things outside its own environment.
4. Through benchmarking, reference points are established for performance measurement of business processes.

2 Types of benchmarking

Benchmarking is thus about comparison of your own organization against other organizations. Different types of benchmarking can be defined based on whom it is compared against and what is being compared (Andersen, 1995).

Compare against *whom*:

- Internal benchmarking, comparison against the best within the same organization or corporation, often called benchmarking within your own class.
- Competitive benchmarking, comparison against the best direct competitors, which then can be termed benchmarking against someone in the parallel class.
- Functional benchmarking, comparison against organizations that are not necessarily competitors, but that performs related tasks within the same technological area. In the school analogy, this will be benchmarking against someone from another school, but of the same type.
- Generic benchmarking, comparison against the best, regardless of industry or markets, which can be said to be benchmarking against someone from a totally different school.

Looking at these types, the further down the list we go, the further away from our own little world we move. This is attempted illustrated in Figure 2.

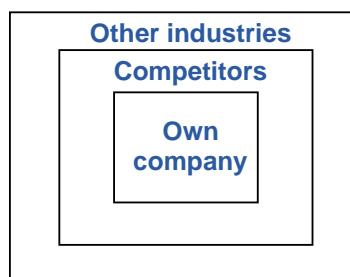


Figure 2 Benchmarking out of the box

Comparing *what*:

- Performance benchmarking, comparison of pure key figures or other performance measures. If drawing a parallel to the world of sports, performance benchmarking says something about how high we should aim, but nothing about how to make that height.
- Process benchmarking, where we go beyond performance measures and also compares how business processes are performed, not only how well they are performed. This will give answers to questions like how to jump, which equipment to use, etc. to clear this height.
- Strategic benchmarking, comparison of strategic decisions and dispositions at a higher level. This is really a less frequently used variant of benchmarking. In the sports example, this could say something about which jumping field to select.

The differences are again attempted illustrated by a figure, as shown in Figure 3.

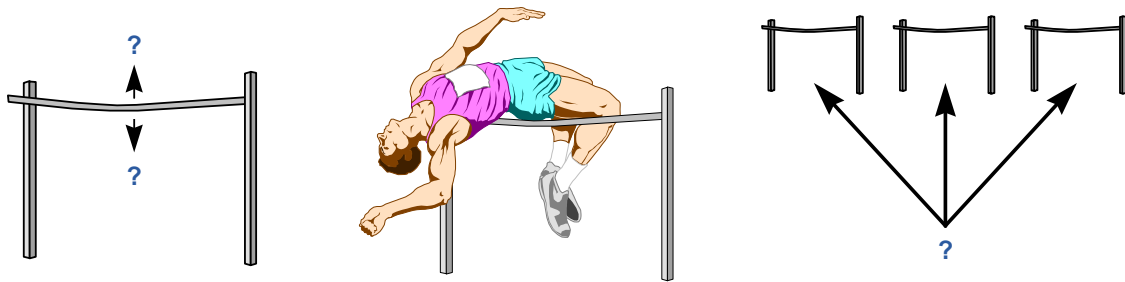


Figure 3 Three types of benchmarking based on what is being compared

Each type from these two categories, i.e., whom and what is being benchmarked, can in theory be combined into a benchmarking study with a given focus. In practice, not all of the possible combinations are equally suitable, as is shown in Figure 4. As can be seen, some combinations of types of benchmarking are more relevant than others. An internal comparison has only a limited value as very little of entirely new information is available and since the potential for finding large improvement opportunities is limited. Strategic benchmarking internally will in most cases be rather meaningless.

Competitive benchmarking can be useful when comparing performance levels and/or strategies. Process benchmarking against competitors is on the other hand very difficult and will rarely be viable due to problems related to exchanging detailed and sensitive information about business processes.

Functional and generic benchmarking produce the highest value when combined with process benchmarking. Comparing performance measures and strategic decisions with companies that are very different is of limited relevance. Studies have shown that the best results are generally achieved by a combination of process benchmarking and partners from other industries, i.e., functional or generic benchmarking.













	Internal benchmarking	Competitor benchmarking	Functional benchmarking	Generic benchmarking
Performance benchmarking				
Process benchmarking				
Strategic benchmarking				
	Relevance/value: High	Medium	Low	

Figure 4 Recommended combinations of types of benchmarking

Furthermore, the different types of benchmarking can to some extent be used in a concerted effort. In this respect, a typical benchmarking study progress is outlined in Figure 5. Both to give an indication of where the organization stands and what should be improved, as well as finding possible benchmarking partners, as a start, performance benchmarking can be used. Next, process benchmarking is used to really improve through observing what the best do.

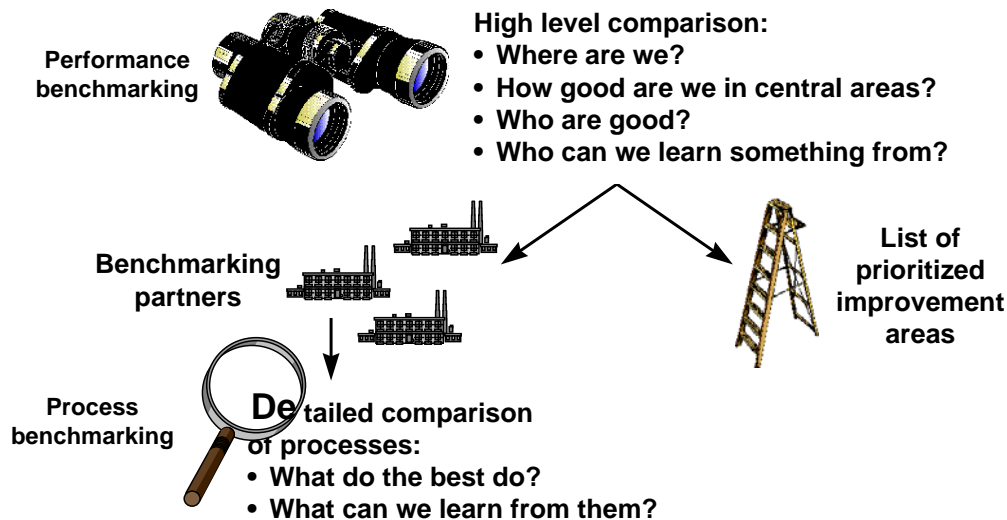


Figure 5 A typical benchmarking study progress

3 Ethical and legal aspects of benchmarking

In an early phase of the development of benchmarking, many critical voices were heard on the issue of the ethical side of benchmarking. Many claimed that benchmarking was about getting as much information as possible from the benchmarking partners, without giving anything in return. This is of course not right, any benchmarking cooperation is based on

mutual benefit. Still, it was accepted by the pioneers of benchmarking that it might be positioned somewhere on the borderline of the ethically acceptable, and several interest organizations for benchmarking teamed up to establish a set of ethical guidelines for benchmarking. These guidelines describe in detail how a benchmarking organization should behave in different situations. It will take too long to recite all the paragraphs here, but compressing them, they turn out to be rather biblical:

- Do to your benchmarking partners as you want them to do to you.
- If you are in doubt whether an activity is legal or ethically justifiable, refrain from it.

In much the same way, it has at times been alleged that benchmarking is nothing but industrial espionage put into a system. This is obviously not true either, but at the same time, you should be aware of existing legislation that could limit the use of benchmarking. While US legislation, at least not yet, poses any difficulties for benchmarking organizations, the same might not be completely true in Europe. Article 85 of the European Treaty prohibits any agreement or conduct coordinated with others that can distort competition or have an effect on trade within the European market. Reading this article to the letter, it is easy to understand why some express concern with regard to benchmarking. Benchmarking is nothing if not conduct coordinated with others for the purpose of improvement, which in turn can distort competitive conditions. On the other hand, as far as the author is aware, there have been no legal disputes on the use of benchmarking.

Still, it might be pertinent to display some caution, especially when benchmarking using suppliers, customers, or competitors as benchmarking partners. In the latter case, under no circumstances should the benchmarking study focus on issues like:

- Prices or pricing policies.
- Marketing strategies.
- Production capacities.
- Product standards.
- Other commercial or sensitive information.

4 Conducting a benchmarking study

Benchmarking is conducted in separate projects whose individual objective is to improve one of the organization's business processes. A benchmarking study includes the activities necessary to:

- Study and understand our own process.
- Find benchmarking partners.
- Study the benchmarking partners' process.
- Analyze the differences between our own and the benchmarking partners' processes.
- Implement improvements based on what was learned from the benchmarking partners.

There are a number of models describing the different steps that constitute a benchmarking study. One such model is the so-called benchmarking wheel, as portrayed in Figure 6 (Andersen and Pettersen, 1996).

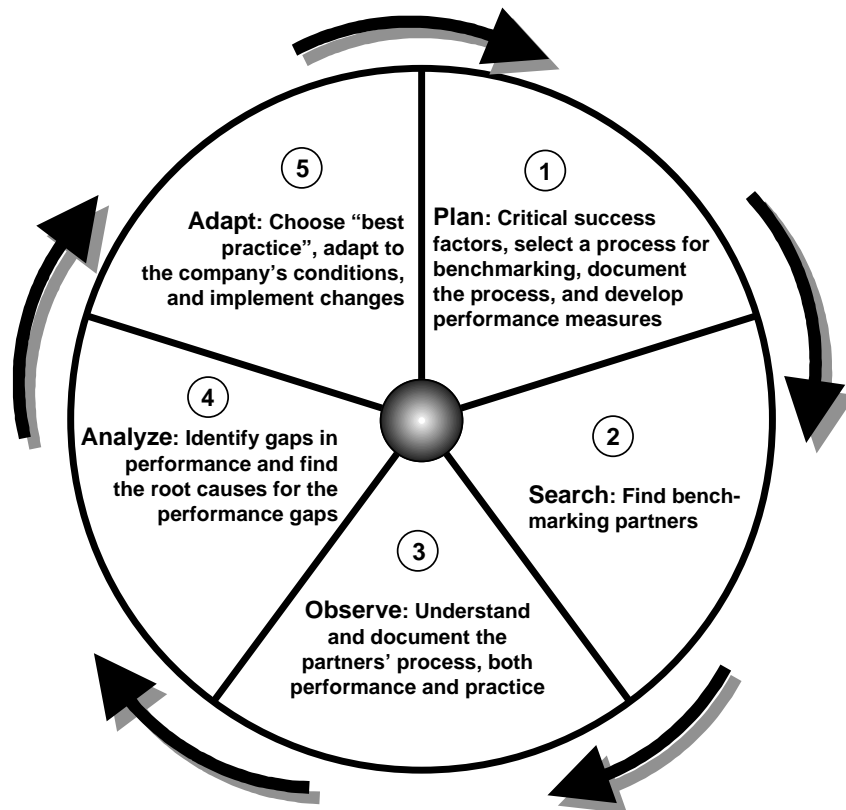


Figure 6 The benchmarking wheel

Ordinarily, a benchmarking study lasts between six and eight months, depending somewhat on the extent of the process being benchmarked. Often, the implementation of improvements itself, the main content of the adaptation phase, can take longer. For the other phases, a normal estimate is that approximately 50% of the time is spent on planning, 20% on observations of the benchmarking partners, and 30% on analysis of collected data. A brief description of each of the phases follows:

4.1 Plan

The planning phase coarsely contains four activities:

1. Select the process to be benchmarked.
2. Establish a benchmarking team.
3. Understand and document the process to be benchmarked.
4. Establish performance measures for the process.

Three criteria can be used for selecting the process to benchmark:

1. The process' impact on the company's critical success factors.
2. The process' importance for the main functions of the company.
3. Processes that represent or impact obvious problem areas in the company.

The decision can be based on:

- The use of analytical tools and techniques. Some of the more common are performance matrix, spider chart, and criteria testing.

- “Gut feeling”.

Anyway, the important point is that some critical issues are addressed:

- Why this process? Is it really this process that is most important?
- The process is better defined and narrowed down to a more manageable scope.
- The process to be benchmarked is decided upon in agreement and in common understanding between the parties involved.

After the process to be benchmarked has been determined, a so-called benchmarking team must be appointed which will assume the responsibility for carrying out the benchmarking study. The normal size of such a team is between three and eight persons, depending on the scope of the study and available resources. The first task for the benchmarking team is to go through, understand, and document the selected process, if this has not been done prior to deciding on benchmarking as the tool to use. The last step of the planning phase is to develop performance measures for the process. These will enable determining the current performance level, comparing own performance to that of the benchmarking partners, as well as registering achieved improvements.

4.2 Search

The contents of the search phase is as follows:

1. Compile a list if criteria an ideal benchmarking partner should satisfy.
2. Search for potential benchmarking partners.
3. Compare the candidates and select one or more partners.
4. Establish contact with the selected partner(s) and gain acceptance for their participation in the study.

The first of these steps is actually a search-technical task. No matter what is being searched for, e.g., books in a library or partners for benchmarking, it is preferable to limit the search space. Starting a search among all possible organizations and considering them potential partners can result in an extremely complicated search. It can therefore be wise to think through what qualities the ideal benchmarking partner should possess, and consciously search for these. To find potential partners, a number of sources can be utilized. First of all, the organization’s own network can usually provide much useful information. This pertains both to customers, suppliers, and other with which there is cooperation. Furthermore, different experts within the field can often be of help. Various industry associations possess much knowledge about actors in the field. Media coverage can give hints, as can all public information. Another area for information search that has taken off lately, is the Internet.

The conclusions after many benchmarking studies are that this phase is indeed difficult and should not be underestimated. Generally, it is recommended using more than one partner, the usual being between three to five. The costs obviously increase with an increasing number, but they are often outweighed by the advantages and the potential for truly finding best practice. The last activity in the search phase is to establish contact with the partners with which it is desired to pursue closer cooperation in the benchmarking study. There are no correct answers as to how to design such a query or how to present it to ensure acceptance from the potential partners. An important element is, however, that you are willing to enter

into a give-and-take agreement. Being willing to open up our own organization and giving the benchmarking partners information in return, the likelihood for seeing the request positively answered increases.

4.3 Observe

This phase is really about documenting the benchmarking partners' process the same way this was done for our own process in the planning phase. A little more systematically, the observation phase covers three steps:

1. Assess the information needs and information sources.
2. Select a method and tool for collecting data and information.
3. Perform data collection and debriefing.

To collect the information and data about the benchmarking partners, there are a number of possible ways available. We separate between methods, i.e., the means utilized to get in touch with the partner, and tools, i.e., which specific technique is used to collect data. The matrix of Figure 7 summarizes some of the most common of these, where the crosses indicate relevant combinations.

Tools Methods	Questionnaire	Interview	Direct observation
Postal investigation	X		
Telephone	X	X	
Partner visit	X	X	X

Figure 7 Methods and tools for the observation phase

4.4 Analyze

After having collected information and data about the benchmarking partners' processes, the next step is to analyze the data material for the purpose of identifying improvement suggestions. The analysis phase actually consists of five steps:

1. Sort the collected information and data.
2. Quality control the collected information and data.
3. Normalize the data.
4. Identify gaps in performance levels.
5. Identify causes for the gaps.

The first two are really preparatory tasks that are included to ensure that all the data is available and without any errors or inaccuracies. Before starting the actual analysis of the data, it can often be pertinent to normalize the data set. A common argument against benchmarking is that what is being compared is so unique that no comparison is even close to being relevant. Most things can, however, be compared if beforehand, a normalization is carried out. Normalizing means adjusting for the conditions that are truly different. It often consists of recalculating the data to average values or ratios that eliminate aspects like size, market conditions, different legislation, cost levels, etc. Undertaking the right normalization

steps can often be complicated and highly dependent on the situation at hand, thus this issue is not presented in any more detail here.

One central element of the analysis phase is a gap analysis. This entails both identifying gaps as well as determining the causes for these gaps. The gap itself is of less help when it comes to identifying improvement actions. The purpose of the gap is to prove that the partners do something that renders them able to perform better than ourselves. The presence of a gap is thus more a signal that there is something worth examining more closely.

To also find the causes for the gap, there are several techniques available. A relatively less complex approach is to directly compare the flow charts for the processes. This can often provide much information about differences between them that can constitute sources for higher performance. Other tools suitable for this purpose are cause-and-effect chart, relations diagram, and root cause analysis. Irrespective of which approach is employed, the desired result from this phase is a list of the conditions believed to contribute to the superior performance levels of the benchmarking partners.

4.5 Adapt

Coarsely speaking, the adaptation phase consists of four steps:

1. Describe the ideal process and summarize improvement actions based on it.
2. Set targets for the improvements.
3. Develop an implementation plan, carry out the plan, and monitor the progress.
4. Write a final report from the benchmarking study.

Since these steps are general and occur in almost every improvement project, they are not dealt with in any more detail here.

5 Results achieved through the use of benchmarking

Benchmarking emphasizes attaining so-called breakthrough improvements, as shown in Figure 8.

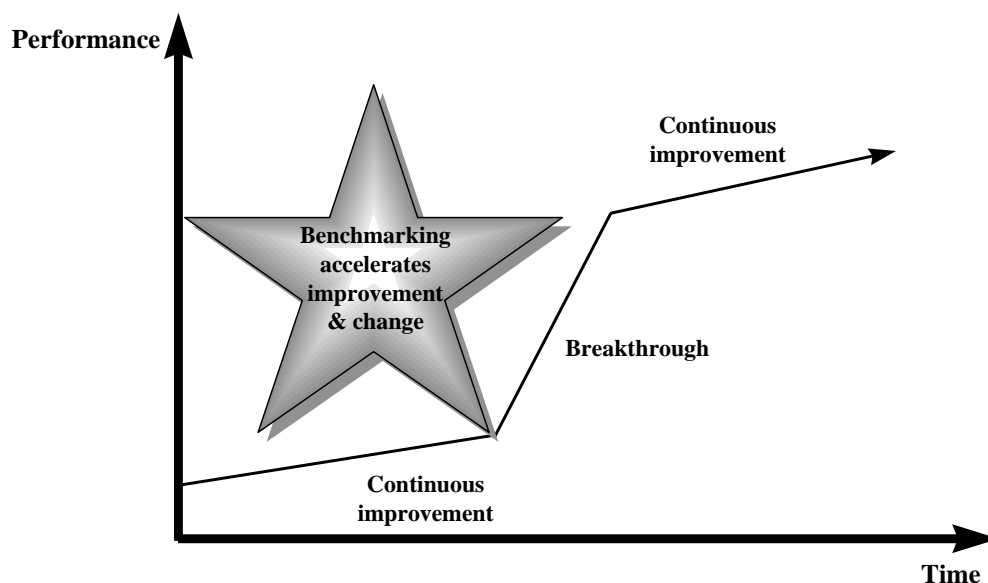


Figure 8 Benchmarking versus continuous improvement

Breakthroughs of the type illustrated by the star are usually accomplished by introducing practices that are new to an industry, through generic benchmarking. Some examples are shown in Table 1.

Problem	Compared with
Long admittance times in hospitals	Hotel receptions
Too lengthy setup of machines	Formula 1 pit crews
Planning the delivery of fresh concrete	Hot pizza delivery
Unstructured maintenance of power turbines	Maintenance of aircraft engines
Difficult to manufacture shell cases with the right cylindrical shape and smooth surface	Manufacturing of lipstick tubes

Table 1 Breakthroughs through benchmarking

5.1 Research on the results achievable through benchmarking

The author obtained his Ph.D. from a study of the results that companies have actually achieved through the use of benchmarking, and this section of the paper describes this study. After having read quite a few books and articles dealing with benchmarking, the general impression before starting this study was that benchmarking was treated as some kind of wonder tool that would give radical breakthrough improvements any time and in any situation. Little research, on the other hand, had been done that provided evidence of the results of benchmarking. Thus, the study strived to answer the question “Does benchmarking work?” (Andersen, 1995), and furthermore to investigate whether benchmarking gave better results for some organizations, in some situations.

Data for the study was collected through a survey using a written questionnaire distributed by mail or fax to around 500 organizations across the US and Europe. Approximately 70 completed questionnaires were returned, and these formed the basis for data analysis and the subsequent conclusions.

The following data was required for the research:

- General background data about the respondent organizations, e.g., size, performance, quality maturity, etc.
- Specific background data about the use of benchmarking in the respondent organizations, e.g., how long benchmarking had been used, how many benchmarking studies had been performed, degree of organizational support for benchmarking, benchmarking training, etc.
- Situational data about the conditions of the conducted benchmarking studies, e.g., type of benchmarking used, link to strategy, benchmarking process used, benchmarking team size and composition, etc.
- Result data, e.g., financial savings, performance improvement, increased motivation for change, general benefits, etc.

The respondent organizations displayed large variation in terms of organization size, expressed as the number of employees and annual sales. For other types of variables, the variation among the respondent organizations was equally extensive. The organizations

represented a high number of different industries, displayed large differences in terms of general quality experience and benchmarking experience. Benchmarking training, support, and resources ranged from absolute minimums to more than sufficient.

The benchmarking result variables for which data was collected were:

- Ability to improve, i.e., whether the respondent organization had been able to implement improvements from the benchmarking studies. Measured as yes, sometimes, or no.
- Time delay to improvement, i.e., whether improvements had been implemented directly after the benchmarking study or there had been a time delay before collected information had been utilized for improvements. Measured as yes, sometimes, or no.
- Financial savings, i.e., the extent of financial savings achieved as a direct result from improvements made in benchmarking studies. Measured as very low, low, medium, high, or very high.
- Operational improvements, i.e., improvements in operational variables, though not necessarily leading to direct financial savings, as a consequence of benchmarking studies. Measured as very low, low, medium, high, or very high.
- Increased process thinking, i.e., to what extent conducting benchmarking had increased the organizational understanding of horizontal business processes. Measured on a scale from 1 to 10.
- Improvement motivation, i.e., to what extent using benchmarking had increased the organizational motivation for change and improvement. Measured on a scale from 1 to 10.
- Overall benefits, i.e., a subjective impression of the overall benefits achieved through the use of benchmarking. Measured on a scale from 1 to 10.

Table 2 summarizes the most essential data. In addition, the entire data set for the last variable, overall benefits, is displayed in Figure 9.

Variable	Responses					
Ability to improve	Yes = 35	Sometimes = 10	No = 8			
Time delay	Yes = 32	Sometimes = 9	No = 7			
Financial savings	Very low = 8	Low = 13	Medium = 15	High = 8	Very high = 11	Mean = low to medium
Operational improvement	Very low = 4	Low = 13	Medium = 27	High = 4	Very high = 5	Mean = medium
Process thinking					Mode = 7	Mean = 6.1
Improvement motivation					Mode = 6	Mean = 6.0
Overall benefits					Mode = 5	Mean = 5.6

Table 2 Summary of the benchmarking results data

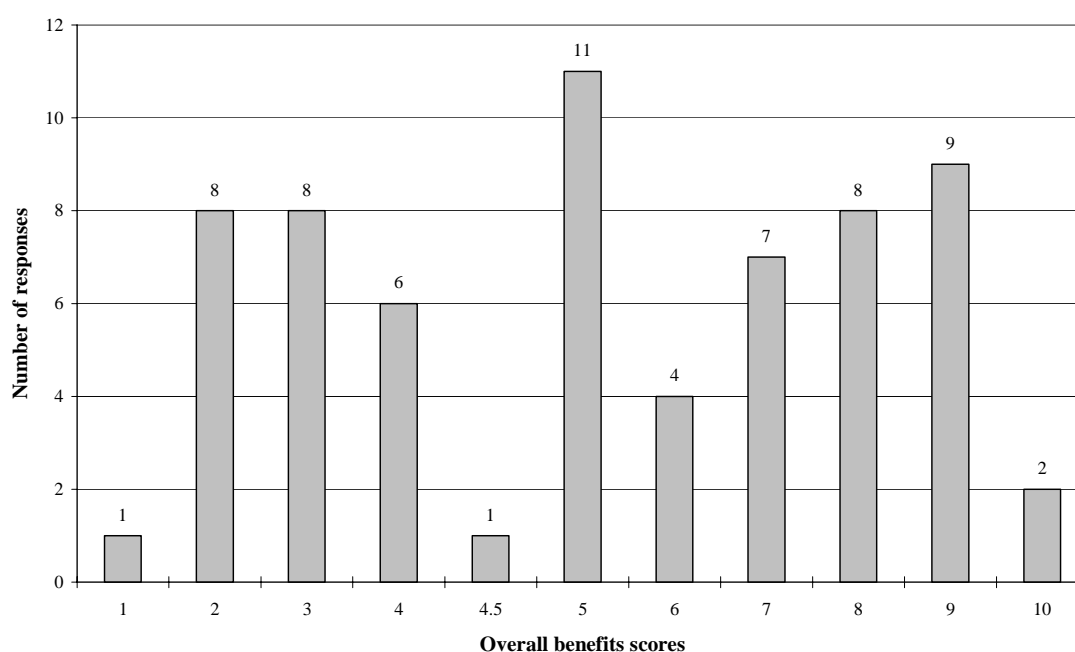


Figure 9 Overall benefit responses

With reference to the first posed question, “Does benchmarking work?”, an unambiguous answer could not be given from the collected data. The survey responses showed a large degree of variation and based on a brief inspection of the data material, the answer to this question was:

- Yes, some of the organizations reported good results, sometimes in the extreme upper end of the result scales.
- No, for some of the respondents the results had been poor, sometimes in the very low end of the scales.

This confirmed the hypothesis that benchmarking results varied from organizations to organizations and from situations to situations. The next step in the analysis was to look for

any trends in the data material indicating a relationship between the results and one or more of the organization-related or situational factors.

Each of the input variables, i.e., the organization-related and situational factors, should be analyzed for any significant impact on any one of the result variables. Thus, correlation coefficients were either calculated or median tests were performed for all data pairs. The study revealed no single factor or set of factors that were, beyond statistical doubt, correlated to any of the result variables. Hence, no definite means of explaining the result variation in the data material was found. There could be at least two reasons for this phenomenon:

1. The outcome of a benchmarking effort could be the result of a set of complexly interrelated factors, working in different directions and together governing the final outcome. Such an explanation would mean that there actually was a system in the observations, although probably in the form of more obscure patterns of association. Finding such a pattern, if at all existing, would be very difficult, not in the least simply due to the sheer number of possible combinations of variables.
2. Acting on its own or in combination with a more complex pattern, random events could have played a more or less important part in determining the observed results. If so, no such pattern of variables as mentioned above could be found, simply because such a consistent pattern would not be present.

However, if lowering the correlation coefficient level requirement, some medium strength indications of correlation between variables were found:

- Positive connection between the existence of a formal benchmarking program and financial savings from the benchmarking studies.
- Positive connection between benchmarking support, both from management and employees, and increased process understanding in the organization.
- Positive connection between both benchmarking support from management/ employees and financial/staff resources for benchmarking, and increased improvement motivation.
- Positive connection between benchmarking support from management/employees and overall benefits from benchmarking.

Thus, from observations of the collected data set, my general conclusion was that benchmarking results can rarely be predicted. There is, for example, no grounds for claiming that smaller organizations will benefit less from benchmarking than larger ones. Neither should the amount of benchmarking training nor the benchmarking study costs directly influence the outcome. While this might seem somewhat unfair and irrational, the fact remains that none of these factors were found to do so in the collected data set.

This should not discourage anyone from taking up benchmarking, on the contrary. The survey revealed some below medium results and even some failures. These pointed out that it should not be taken for granted that benchmarking will give good results. On the other hand, above medium results and successes were also found in all types of organizations and situations. They showed that anyone can succeed, no matter what conditions they are in. The problem is, by reviewing a specific organization and the situation it wants to use benchmarking in, it is not possible to, with any certainty, predict whether it will be successful or not.

6 Literature

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